exceedingly varied and beautiful, and especially characteristic of the species in which they occur.

The author has named and figured the whole of the spicula described in the paper, and has traced some of the most complicated ones from their earliest and simplest state, through all the stages of their development to the adult condition. More than a hundred distinct forms of these organs are thus described, so as to render them available hereafter to naturalists as characteristic of species.

XXVI. "Researches on the Intimate Structure of the Brain; Human and Comparative.—Part I. The Medulla oblongata." By J. Lockhart Clarke, Esq., F.R.S. Received June 18, 1857.

(Abstract.)

The medulla oblongata, as described in this memoir, extends from the first cervical nerve to the lower border of the pons Varolii. Of its elementary parts, the author first traces the *arciform fibres*, which may be divided into a superficial and a deep layer. Those of the superficial layer may in turn be divided into three sets. The connexions of these are first followed out in detail; the fibres of the deep layer are described further on. In all mammalia these fibres are very distinct, but less intricate than in man. They may be found also in birds, reptiles, and fishes.

The *anterior pyramids* are found to be composed of *four* orders of fibres:—

1. *Decussating fibres* from the *lateral columns*, forming their chief bulk.

2. *Decussating fibres* from *the posterior columns* and *posterior grey substance*, chiefly at the upper part.

3. *Decussating fibres* from the *anterior grey substance*.

4. *Non*-decussating fibres of the *anterior columns*, separate on their outer side, and on their inner side incorporated with those which form the decussation.

In mammalia generally the decussating fibres are much less numerous than in man. In birds there is an evident but feeble decussation.

Of the *corpora olivaria* it is remarked, that they are to be found not only in all mammalia, but also to a certain extent in birds. In man, the surface of each olivary body consists of two layers of fibres —transverse and longitudinal; the former in part belong to the arciform system,—the latter are continuous with the antero-lateral column. A broad transverse commissure unites the two bodies. The *corpus dentatum* is a convoluted vesicular sac, consisting of nucleated cells of small and rather uniform size, from $\frac{1}{1300}$th to $\frac{1}{1700}$th of an inch in diameter, but varying in shape, and many of them sending out processes—some one, others two, three or more. The connexion of the fibres with the convolutions of the sac is extremely complicated, and not to be made intelligible without the aid of diagrams. It may be stated, however, that the fibres which are confined to the cavity of the sac, with some others, take their origin from the cells.

In mammalia generally the olivary bodies are nearly concealed behind the pyramids, and vary in their appearance at the surface in different animals. The vesicular sac, or *corpus dentatum*, is thrown into only a few comparatively large convolutions. On the outer side of each olivary body, and separated from it by a groove which lodges the hypoglossal nerve, is another vesicular column, not hitherto described by anatomists, and of which the analogue is found in the human medulla.

As the fibres of the lateral columns cross over to the anterior pyramids, the posterior cornua sink as it were forwards, while their terminal tufts—*the gelatinous substance*, gradually increasing in bulk, reach the surface, and form the grey tubercles of Rolando. At the same time, and close to the posterior median fissure, the grey substance is raised into a small conical projection, from which a network of blood-vessels and fibres extends backwards into the posterior pyramid. Within the projection, and amongst the network, cells are developed, which are circular, pyriform, or irregular in shape, and give off one process or several. Further outwards, another, but larger projection and another network extend backwards into the restiform body, containing cells of the same character, but of superior size. These additional productions may be called respectively the *post-pyramidal* and *restiform* ganglia.

As the medulla ascends, the *root* of the *posterior cornu* and the

whole of the *anterior cornu* are gradually resolved or spread out into a beautiful and complicated network, containing a multitude of variously-shaped cells, which communicate and surround with their processes the longitudinal bundles of the white columns enclosed in the meshes. The post-pyramidal and restiform ganglia continue to increase in size, as do also the terminal tufts of the posterior cornua, which, like the former, are traversed by an extension of the network, and interspersed with cells. At the lower extremity of the olivary bodies, the decussation of the anterior pyramids, although still considerable, is very much reduced; for while its fibres derived from the lateral columns have been gradually decreasing in number, those which proceed from the posterior columns and posterior grey substance have been increasing, though not in the same proportion. These latter fibres may be traced backwards from the decussation chiefly to the restiform body and its ganglion, in which they wander in various directions, crossing each other, and becoming longitudinal.

In front, and at the side of the central canal, a new group or column of cells begins to make its appearance,—the nucleus of the hypoglossal nerve; and *behind* and on each side of the canal appears the nucleus of the spinal-accessory nerve, which is connected with its fellow of the opposite side, at the bottom of the posterior fissure, by a transverse band of fibres,—the continuation of the posterior commissure of the medulla spinalis. Of the spinal-accessory nerve, some of the upper roots proceed to their own nucleus, while others bend forwards into the hypoglossal nucleus, and in part join its fibres, to decussate through the raphè with those of the opposite nerve. The *vagus* nerve arises from a continuation of the spinal-accessory nucleus, and, on its way outwards, passes through the terminal tufts of the posterior cornu, or the so-called *gelatinous substance*. The vagal and spinal-accessory vesicular nuclei or columns, after appearing in the fourth ventricle, and diverging so as to expose the hypoglossal nucleus, sink abruptly beneath a new mass of vesicular substance which makes its appearance on each side of the ventricle. This is the auditory ganglion. It commences by a point on the outer side of the vagal nucleus, with which it is intimately connected, and is developed from the inner part of the post-pyramidal ganglion. Its cells are various in shape, and as they are developed

from the inner part of the posterior pyramid, the outer side of the latter undergoes a remarkable change of structure, and becomes the chief origin of the *anterior division* of the auditory nerve, which in its course outwards runs between the restiform body and the *gelatinous substance* or posterior cornu. The posterior division of the nerve winds transversely inwards over the restiform body to reach the auditory ganglion.

Intimately connected with the auditory nerves and ganglia is the structure which, in animals, is called the trapezium, and which the author has found to enclose a remarkable vesicular sac resembling that of the olivary bodies. The analogue of the trapezium exists in the human medulla.

The facial nerve, or portio dura of the seventh, after passing through the trapezium, proceeds transversely inwards to the *fasciculus teres*, which contains a mass or column of stellate cells, and through which it spreads, exchanging fibres or forming a loop with the sixth or *abducens* nerve, which arises from the same nucleus. The glossopharyngeal nerve has more than one origin. It passes out in several bundles through the gelatinous substance or posterior cornu, *in* which it forms a plexus with longitudinal fasciculi of fibres which may be traced upwards to the larger root of the fifth nerve.

The connecting fibres between the anterior and posterior portions of the medulla are very numerous and complicated. For convenience of description, they may be divided into two parts,—superficial and deep. The superficial are the superior layers of the arciform system, and arise from the restiform body and its ganglion: the deep fibres, more or less blended with the first, arise from the remains of the post-pyramidal and the restiform ganglia. Together they form a complicated network, or plexus, interspersed with innumerable and variously shaped cells, which frequently communicate around the longitudinal bundles of the lateral columns, through which and the olivary body the fibres of the plexus proceed forwards and inwards to the raphè, where they decussate with those of the opposite side, and become continuous with the arciform fibres which were traced to the raphè round the anterior pyramids as the superficial set. The raphè, therefore, is the seat of a very complicated

decussation between the posterior halves of the medulla, on the one hand; and on the other, between each of these and the olivary body of the opposite side.

The memoir contains the details of other observations on the medulla of man and the lower animals.

XXVII. "On the Early Stages of Inflammation." By JOSEPH LISTER, Esq., F.R.C.S. Eng. and Edin., Assistant Surgeon to the Royal Infirmary of Edinburgh. Communicated by Dr. SHARPEY, Sec. R.S. Received June 18, 1857.

(Abstract.)

In this communication the author gives an account of an investigation with which he has been recently occupied, into the process of inflammation in the Frog's foot. The paper is divided into four sections, with an introduction and conclusion.

In the introduction it is observed, that "so far from our knowledge of inflammation being in a satisfactory condition, authorities are at variance upon the fundamental question whether it is to be regarded, in accordance with John Hunter's opinion, as active in its nature, and consisting in an exaltation of the functions of the affected part, or whether it should not rather be considered a passive result of diminished functional activity.....In seeking for the solution of this great problem, we cannot expect to gain much from the contemplation of the more advanced stages of inflammation.....It is upon the first deviations from health that the essential character of the morbid state will be most unequivocally stamped, and it is therefore to the early stages of inflammation that our attention must be chiefly directed."

Some cases are then mentioned to show that "in the early stages of inflammation in the human subject, whether induced by mechanical irritation or by an acrid application such as mustard, or of spontaneous origin, the minute vessels become abnormally loaded with red blood, the corpuscles of which ultimately become to a greater or less extent arrested prior to the occurrence of effusion." It is afterwards shown, from numerous facts, that "conclusions arrived at from the